

the steps already taken or the plans they have, if any, to ensure a safe and constant supply of water to the inhabitants of Ernakulam, which is almost entirely dependent upon pipe water supply at present?

Mr. V. K. ARAVINDAKSHA MENON (*Chief Engineer*).

The attention of the member is invited to the Government Order, dated the 7th of April 1922, C. No. 1241/96 (P. W. D.), published in the Government Gazette, dated the 10th of Medam 1097.

Introduction of Meters in the Town.

Mr. A. B. SALEM (*Jews*).

93. Will the Government be pleased to lay on the table their reasons for mooted the idea of introducing meters in the town?

Mr. V. K. ARAVINDAKSHA MENON (*Chief Engineer*).

A note on the subject prepared by the Chief Engineer is appended (*Vide Appendix 3*).

Mr. A. B. SALEM (*Jews*).

94. Will the Government be pleased to inform if they are aware that metering places a check to the legitimate and necessary enjoyment of water by the people, and that the same is introduced mainly only in service-connections, laid for industrial and commercial purposes and in places such as hotels, etc., where they are bound to maintain a sufficiently ample minimum quantity of water supply for the enjoyment of the inmates thereof?

Mr. V. K. ARAVINDAKSHA MENON (*Chief Engineer*).

(a) The metering of houses-service-connections does not, in any way, restrict the legitimate use of water for domestic purposes, as a free allowance is made for such purposes. It checks only the extravagant use of water. It will be recognised that it is well nigh impossible for any system of Water-works to be designed to give an unlimited use of water for all enjoyments of a community. The design is based on a certain allowable limit—a maximum of fifteen gallons per head per day in the case of our Works—and, when this limit is reached and more demand for water is made, it is obvious that the system must fail. Hence the adoption of meters to check exorbitant use of water and bring down the consumption to the limit of the design of the Works.

(b) The Government is aware that meters are introduced, not only on all industrial and commercial water services, but also on private services as well. The general adoption of meters is enforced on all Municipal Councils by the Sanitary Engineer to the Madras Government; and I am informed that all the Municipal Towns in the Madras Presidency have meters on private connections as well. Their fixture is enforced on all the service pipes in places where the limits of the design have been over-reached.

APPENDIX 1.

*Chief Engineer's letter, dated the 9th of March 1916,
C. No. 19/91.*

"Adverting to the P. W. D. official memorandum dated 14th August 1915, Dis. No. 1053/D/91, forwarding for consideration of the committee a petition, dated 12th Karkadagam 1090, from the ryots of Tiruvankulam and Kurikkad villages, praying for the opening of a canal for the protection of their fields, I have the honour to inform you that, it being purely an irrigation matter, I have dealt with it myself and beg to report as follows:—

The lands mentioned in the petition are primarily single crop *Puncha nilams* lying on the eastern side of the Tiruvankulam, Kurikkad and Kanayannur villages—please vide sketch enclosed—and situated at a comparatively lower level than the adjoining lands with the result that the drainage water from the latter stagnates in these—very often with disastrous effects on the crops, raised in them. The small river to the east of these *nilams*, which forms the boundary between Travancore and Cochin, is the only drainage channel through which the water from these *nilams* can possibly find its way into the backwater; and from past experience, it is found to be inadequate for the purpose. Thus the petitioners' request for a drainage canal for the proper and efficient drainage of their paddy fields deserves consideration.

With regard to the alignment of the canal, it is not possible to fix the same, without conducting a preliminary survey of the site. However, three routes have been suggested, as shown in the sketch. The route A B C D runs through, more or less, *Poramboke*

APPENDIX 3.

Note on meters with special reference to the necessity for their general introduction.

The progress of sanitation in a town depends, to a very large extent, upon the perfection of the arrangements made for the supply of pure water to all classes of the community. But the quantity of water required for each individual per day, is generally left for the Municipality to decide, and the Engineer who designs the Water-works bases his calculations on this rate of supply. The capacity of the Pumping-Plant to supply this water and the sizes of Mains to economically carry this supply to the town depend fundamentally upon this *per capita* consumption that has been decided upon.

The Ernakulam Water-works were designed by the late Mr. Mody, to supply 30,000 people, at $7\frac{1}{2}$ gallons of water per head per day, working 12 hours at Head Works, or, in other words, the machinery at Head Works is capable of supplying a maximum rate of 15 gallons per head per day, when the plant is run continuously day and night. One fact, however, has to be emphasised, namely, that all these data were before the then Town Council at Ernakulam, which scrutinised the final report of Mr. Mody, before the works were actually taken up for execution. The Town Council approved of the Scheme in its entirety, and the works were accordingly carried on, as originally designed. The design is generally made for a period of 25 years, and no great alterations or improvements are expected to be made during this period. The Ernakulam Water-works were designed for a prospective population of 30,000 people—the population at that time being only 20,000—and the works ought, therefore, to last us for 25 years.

Let us now see what the actual average consumption at Ernakulam amounts to. During the summer season, for nearly 3 months, it has been found necessary to run the Head Works machinery continuously all the 24 hours of the day, and the Venturi Meter installed there records a daily supply of 4,80,000 gallons.

The population of Ernakulam according to the latest Census, is 24,500; and this works to about 19.6 gallons per head per day on an average, while the Works were designed for a maximum supply of only 15 gallons. It is thus obvious that the demand for water has far exceeded the limits of design, and it does not require any very great technical knowledge to say that the Water-works is bound to be a failure sooner or later, because the Pumping-Plant installed at the Head Works cannot cope with this excessive demand for water. In order to avoid such a crisis, the teneral introduction of meters is proposed.

Furthermore, owing to such prolonged and continuous pumping, day after day, the Head Works staff scarcely gets any time for repairs or adjustments, and if by chance any mishap or breakdown occurs, a water famine will be imminent for the town. To safeguard the machinery, to obviate any such risks of water famine, and for the satisfactory continuance of water supply, steps have to be taken to bring down the consumption, and to this end there is no other remedy so effective as the general introduction of meters. That has been the practice everywhere.

The question of waste is viewed in different lights. The house-holder, who has paid his water-tax, feels at perfect liberty to use or waste all the water that he or his household can get, and yet considers that there has been no wastage going on in his premises. He uses eighty to one hundred gallons of water for bathing purposes alone, and in his opinion this cannot be called waste, because this water is used for cleaning his body. Another may use pipe water for watering gardens or sprinkling his lawns, and yet holds that there has been no wastage in his premises. In short, from the standpoint of the house-owner, there cannot be any wastage so long as water is used for some specific purpose. But the department, whose duty it is to see that the water supply system goes on satisfactorily, views such exorbitant use from a different angle. It has to see to the design of the Works, and whenever it finds that a household uses more water than is allowed for in the design of Works, it says that there is enormous wastage. In order to correct such wastage, or exorbitant use, meter seems to be the only remedy.

This question of metering has brought forth all sorts of protest meetings in which impassioned speeches were made, as if meter were a dangerous being that will raise water bills for the mere fun of it. Ample provision has been made for free allowance to each house in proportion to its rental value, and if all the owners of houses, where water services are laid on, were satisfied that there is no wastage going on in their premises, there is no reason for such protests at all. The question, even if it be merely the cost of the meter and its installation, ought not to be viewed in a prejudicial light. In the first place, the house which has a water service laid on to it, naturally brings in more rent, and the value of that property also is considerably increased. As such, the mere installation of a meter, which comes to about Rs. 60 all told, will not be considered much in proportion to the benefits derived. Moreover, the original rules framed for the maintenance of water supply enjoined on all house-owners, who desired to have water service laid on to their premises, the installation of a meter also; but this was deferred to a future occasion, especially as the necessity for their installation was not so much felt then, as it is now.

In every town, where a constant supply of pipe water is given, and where the Works have been found to be inadequate to supply the requirements of the people, meters are introduced as a necessary part of the water supply system. The question now reduces itself to this, namely, that the owners of houses are averse to the metering of their services, while they do require a constant supply of pure water, which the Water-works machinery is incapable of supplying. Under such circumstances, for the satisfactory continuance of water supply, the only solution is the introduction of meter. The question naturally arises, 'why not increase the capacity of the pumping plant?' As a necessary corollary, we have to ask, who is to bear this extra expenditure? The Works, as originally designed have been supposed to be a gift to the Ernakulam Town; and these Works, which were designed to last 25 years, have been found to be inadequate to meet the needs of the town within nine years of their starting, mainly due to the excessive use of the water over and above the

limits of the design of the Works. Are we not then justified in proposing the meters to correct such abuse of the water, so as to bring down the consumption and make the Works last for the period for which they are designed? In this connection, however, it may be mentioned that we are generally extending our Works in order to augment the supply. This step to increase the capacity is taken up with a view to supply Mattancheri, with pipe water in the near future. It is unnecessary to state how great a boon it would be to Mattancheri, when this water supply is extended to that town. It has a notoriously bad supply of water, and a protected system of water supply will go a great way to improve the health and sanitation of that town. But if the present excessive consumption of water at Ernakulam goes unchecked, it may not be possible to meet the demands of even Ernakulam alone. The general introduction of meters on all house services is, therefore, proposed.

It may be argued that a competent staff may be employed to bring down the wastage, instead of going in for meters; but it is manifestly impossible to post a man for each two or three groups of houses, where a meter will do the things automatically. Moreover, such inspection cannot accomplish much.

Then, again, it may be argued that all the wastage goes on at the public taps and not in private houses. This is hardly a fact for the following reasons :—

Firstly, all the public taps are waste-not-taps. These waste-not-taps have a peculiar construction in that they discharge about two to four gallons of water for each pressure of the handle, and if the handle is tied down, the tap will automatically close after discharging about four gallons, and unless the handle is released and pressed again, the tap will not yield any water.

Secondly, these public taps are easy of inspection, and are fixed at about 2 to 2½ feet above the ground level, so that it is hard for anyone to bathe or to get a free flow of water owing to their automatic cut-off action.

Thirdly, before the private house-connections were ever introduced, the machinery at the Head Works was never run for more than six hours per day, and it will be borne in mind that all the people, including those that now have water in their premises, had to go

to these public hydrants for their supply of pure water. The public taps were, therefore, more in requisition than they were at any time. But, as the house-service-connections began to increase, the pumping hours at the Head Works had to be extended more and more, until at present we are obliged to run the plant continuously, day and night, during summer. To give one an idea as to how these pumping hours have increased in proportion to the increase in the number of house-connections, a few figures are given below. Only the month of Meenam is taken into consideration, because that is one of the months when the Pumping Plant is called upon to work at its maximum capacity, and it is during such periods of greatest demand that the chances of break-down or failure of supply are most probable.

Year and month.	Average number of pumping hours	Total number of house-connections at the end of the year	Number of public hydrants
Meenam.			
1094	6 hours 20 minutes	15	87
1095	10 " 4 "	109	89
1096	12 $\frac{3}{4}$ " 0 "	221	92
1097	18 " 6 "	315	96
1098	20 " 45 "	390	96
1099	24 " 0 "	425	101
1100	23 " 0 "	434	101

From this it is obvious that the service-connections are chiefly to blame for this excessive consumption of water, because, as already pointed out, not more than six hours' pumping was required, when all the public hydrants were at their maximum demand.

There is yet another point, which may be mentioned, in this connection. If you observe the levels of water in the Elevated Tank, between the hours of 6 and 10 a. m., you will notice that the tank is depleted by about four feet of level, in spite of the fact that pumping goes on at the Head Works uninterruptedly. One foot of level in the Elevated Tank means 15,000 gallons of water. The maximum demand in the town is, therefore, about 35,000 gallons per hour, while the capacity of the pumping machinery is only 20,000 gallons per

hour. There are, in all, about 101 public hydrants in the town, of which 60 are $\frac{1}{2}$ " in size, and the remaining 41 are $\frac{3}{4}$ " in size. The discharge from a $\frac{1}{2}$ " tap is found to be 2 gallons per minute, and that from a $\frac{3}{4}$ " is $3\frac{1}{2}$ gallons. Let us take an extreme case, in which, let us suppose, all the public hydrants are open simultaneously for an hour. The total discharge from the public hydrants for that one hour will be $(120 \text{ plus } 143\frac{1}{2}) \times 60 = 15,810$ gallons, and as the maximum consumption in the town was shown to be 35,000 gallons, the private service-connections are responsible for no less than 20,400 gallons during that hour; and this is all the more conspicuous, as the 101 public taps serve about 20,000 people, while the private services supply only about 4,500 people. It does not, therefore, require any further proof to show that more water is used in private services than at the public taps.

There is an impression among the public that a considerable amount of water is utilised by industrial concerns, such as the Tatas and the Railway Company, and that the inadequacy of the Pumping-Plant to supply the town has been mainly due to this cause. As a matter of fact, both these concerns conjointly draw not more than 10,000 gallons of water *per day*, and every gallon of water that they utilise is paid for. It is only a matter of half-an-hour's pumping at the Head Works but the income derived from these two sources very greatly lightens the burden of the general tax-payer. In fact, half-an-hour's pumping done per day, for these concerns, brings in a year an income sufficient to maintain the whole Water-works for about five to six months. As this is to the interest of the general tax-payer, too much stress need not be laid on this question.

In proposing the introduction of meters, the intention was not to inconvenience the public in any way, but the idea was only to see that the water supply system goes on satisfactorily, and that the benefits of this wholesome water may be extended to Mattancheri, which is sorely in need of it. The history of the waste of water has been repeated in every country that has established Water-works, and the remedy followed in every case has been the same, namely, the *Meter*.